

Claim

1. An electronic control unit comprising a first computer and a second computer, characterized in that:

the first computer includes a first diagnostic means for diagnosing operation of the first computer by performing a first diagnosis and a second diagnosis, in which a first value and a second value are calculated using at least two kinds of operations, a first comparison is performed between the first value and a pre-stored first reference value for determining whether a relationship between the first value and the first reference value is normal, and a second comparison is performed between the second value and a pre-stored second reference value for determining whether a relationship between the second value and the second reference value is normal;

the first computer further includes a data transmitting means for sending a first set of diagnostic data regarding the first diagnosis and a second set of diagnostic data regarding the second diagnosis, respectively;

the second computer includes a data receiving means for receiving the first set and the second set of diagnostic data; and

the second computer further includes a second diagnostic means for determining whether the first diagnostic means normally operates based on the first and the second diagnostic data.

2. The electronic control unit according to claim 1,

wherein:

the data transmitting means sends the first set of diagnostic data including the first calculated value and the first reference value as the first diagnostic data, and the second set of diagnostic data including the second calculated value and the second reference value as the second diagnostic data; and

the second diagnostic means performs a third diagnosis (S410-S450) for determining whether a result of the first comparison is normal, and a fourth diagnosis for determining whether a result of the second comparison is normal.

3. The electronic control unit according to claim 2, wherein:

the first diagnostic means regularly performs the first comparison the second comparison;

the data transmitting means sends any one of the first set of diagnostic data and the second set of diagnostic data whichever most recently generated; and

the second diagnostic means determines that the first diagnosis is halted when a period during which the receiving means has not received the first set of diagnostic data exceeds a predetermined reference period, and that the second diagnosis is halted when a period during which the receiving means has not received the second set of diagnostic data exceeds the predetermined reference period.

4. The electronic control unit according to claim 3, wherein the data transmitting means alternately sends the first set of diagnostic data and the second set of diagnostic data.

5. The electronic control unit according to claim 3, wherein the second computer further including a fault recovery means that performs different fault recovery procedures for different conditions, including conditions in which the second diagnostic means has determined that the diagnosis is halted and in which the second diagnostic means has determined that the comparison performed by the first diagnostic means is faulty.

6. An electronic control unit comprising a first computer and a second computer, characterized in that:

the first computer includes a first diagnostic means for diagnosing operation of the first computer by performing a diagnosis, in which a comparison is performed between a value calculated using a predetermined operation and a pre-stored reference value for determining whether a relationship between the calculated value and the pre-stored reference value is normal;

the first computer further includes a data transmitting means for sending the calculated value and the pre-stored reference value used for the diagnosis performed by the first diagnostic means;

the second computer includes a receiving means for

receiving the calculated value and the pre-stored reference value; and

the second computer further includes a second diagnostic means for determining whether the first diagnostic means normally operates based on a comparison between the calculated value and the pre-stored reference value received by the receiving means.

7. The electronic control unit according to claim 6, wherein:

the first diagnostic means regularly performs the diagnosis;

the data transmitting means sends the calculated value and the pre-stored reference value used in the diagnosis most recently performed; and

the second diagnostic means determines that the diagnosis of the first diagnostic means is at halt when a period during which the receiving means has not received the calculated value and the pre-stored reference value exceeds a predetermined reference period.

8. The electronic control unit according to claim 7, wherein the second computer further including a fault recovery means that performs different fault recovery procedures for different conditions, including conditions in which the second diagnostic means has determined that the diagnosis is halted and in which the second diagnostic means has determined that

the comparison performed by the first diagnostic means is faulty.

9. The electronic control unit according to claim 8, wherein:

the first computer and the second computer are used for controlling the throttle angle of a throttle valve of a vehicular engine; and

the fault recovery means maintains the throttle angle control with a predetermined upper limit when the second diagnostic means has determined that the diagnosis is halted by the first diagnostic means, and stops the throttle angle control when the second diagnostic means has determined that the diagnosis performed by the first diagnostic means is faulty.